# FROM KINDERGARTEN TO GRADE FOUR:

A Longitudinal Study of Learning Abilities and Achievement in Children

Ministry
of
Education

# FROM KINDERGARTEN TO GRADE FOUR:

## A Longitudinal Study of Thriving, Average and Non-Thriving Children

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ANDREW BIEMILLER, Principal Investigator

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The Honourable Sean Conway, Minister

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ABSTRACT

This study extends a previously reported research project[1] from grade 2 to grade 4. The sample includes 54 children perceived by their junior or senior kindergarten teachers as "thriving in terms of your goals"; 64 perceived as "making average progress"; and 50 perceived as "not as yet thriving" in kindergarten. Forty-six children were in a junior kindergarten-grade 1-grade 3 cohort, while the remaining 112 children were in a senior kindergarten-grade 2-grade 4 cohort. Data obtained included test data on language, memory, and academic achievement (MAT word knowledge and math computation, and reading speeds); and teacher-rated data on self-direction, resistance to distraction, social abilities, resistance to frustration, and risk-taking. (These ratings are slightly changed in content from the previous report. New scales are given in this study. A re-analysis of data obtained in previous years is provided in this report.)

Results indicate that differences between children perceived in kindergarten as "thriving", "average", or "not thriving" persisted through grade 4 for language, academic achievement, and teacher ratings of self-direction, resistance to distraction, and risk-taking. Achievement differences were greater for the SK-4 cohort, but still significant for the JK-3 cohort. Rating differences were of the same magnitude for both cohorts. This represents a shift towards larger differences for the JK-3 cohort which had not shown many significant differences between the three groups in grade 1.

Further analysis of the results concerned children who were perceived by grade 3 and 4 teachers to have changed in thrive status versus those who have not. Children "shifting" between average and thriving status or vice versa had corresponding changes in achievement tests and teacher ratings. However, children seen as shifting from non-thriving to average status did not show corresponding achievement test results. Teacher ratings of grade 4 children who shifted status were the same as "consistent average" children. Contrary results were found in grade 3 but with very small (N=7, 3) samples. Kindergarten test and rating data were not predictive of changes in grades 3 or 4.

These results continue to support aspects of the "thrive" concept described in the earlier report and other sources. In brief, these findings indicate the existence of a continuing relationship between school achievement, self-directive capacities, and at least two temperamental characteristics: resistance to distraction and risk-taking. Two other characteristics, social abilities and resistance to frustration have less of a relationship with other aspects of functioning by grades 3 or 4. In terms of early identification, the broad classifications of "thriving", "average", and "non-thriving" in kindergarten continued to be related to functioning four years later. However, some of the variation in these was not predictable.

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1. Biemiller, A. A Longitudinal Study of Thriving, Average, or Non-Thriving Kindergarten Children. Toronto, Ont.: Ministry of Education, 1983.

Practical implications include a continued need for classroom teachers to adapt programs to differences in self-direction and risk-taking, and a need for a further look at the meaning of perceived changes in the status of non-thriving children.

## INTRODUCTION

There has been an increasing interest in research literature over the past two decades in characteristics distinguishing children who "thrive" or function effectively academically, socially, and emotionally, and children who do not. The distinction was first emphasized by Murphy (1962) (cited in Garmezy, 1976, p. 18) and has since been studied by Garmezy et al. (1979), Prescott (1973), Rutter (1979), Thomas, Chess, and Birch (1968), and Murphy and Moriarity (1977).

These writers point to cognitive or intellectual capacities which, combined with certain patterns of social skills or responsiveness, temperamental characteristics and possibly self-regulatory strategies, may predispose a child to an easy, effective adaptation to home and school life or, alternatively, to less satisfactory relations with adults, peers, and work. In an earlier report on the longitudinal sample described here, I suggested specifically that "some children are better 'adapted' to school environments by reason both of their skills and their patterns of response to their environment (temperament) than others" (Biemiller, 1983, p. 197).

This study describes the intellectual, academic, social, self-directive, and temperamental characteristics of two groups of children. One group, the "JK Cohort" was first studied in 1978 in junior kindergarten and again in grades one and three. The other group, the "SK Cohort" was also first studied in 1978 in senior kindergarten and again in grades two and four.

The purpose of this report is to briefly review test and teachers' rating scores for all three periods in relation to kindergarten teachers' thrive rankings. In addition, changes in thrive status as perceived by grade 1-4 teachers (which are associated with actual changes in performance and other teacher ratings) will be examined to identify the characteristics of children who improved markedly versus those who did not, as well as those changing from "thriving" to average status. Correlations between variables over time will be reported. (As will be detailed later, multiple regression analysis failed to identify important combinations of variables for predictive purposes.)

A more detailed report of research conducted through grade two is already available. (Biemiller 1983) That report includes details on the demographic background of the children and the educational programs the children experienced.[a]

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a. The original focus of this study concerned a comparison of half day, alternate full day, and full day kindergarten programs. In kindergarten and grades 1 and 2, no important differences in the children were attributable to types of kindergarten programs. This finding was repeated for all measures in grades 3 and 4.

## RESEARCH SAMPLE AND METHODS

### 1. Sample

The original sample was drawn from mostly rural schools in five Roman Catholic Separate School Boards in Ontario. This population was originally chosen in order to study differences in kindergarten programs which could only be compared in this unique group. Details of socioeconomic status are reported in Biemiller, 1983. I will note here that the group contained representatives from most economic levels, but was not subject to the degree of family or economic disorganization which characterizes many urban and less religious communities. Thus there was only one family without a father, and one with an unemployed father out of 213 children in 1980. Within this sample, socio-economic variables proved to be very little related to "thrive status" or other ratings and tests (See Biemiller, 1983). In other words, the individual differences found among the children must be attributed to constitutional differences and to aspects of child-rearing and educational experience that were not, within this sample, much related to traditional socio-economic indicators such as occupational status, educational status, or languages spoken in the home.

The final sample available for all three test periods included 158 children, drawn from the 213 available for kindergarten through grade 2. Most of the decline was due to problems in arranging for teacher ratings rather than children moving. A somewhat larger sample is available for kindergarten to grade 3/4 omitting 1/2. However, results reported here refer to children who were in all three parts of the study. Numbers of cases are shown in Table 0.

Table 0
Numbers of Cases in JK-Gr. 3 and SK-Gr. 4
Cohorts by Kindergarten Thrive Rating

| | Kindergarten Thrive Rating | | | |
|---|---|---|---|---|
| Cohort | Thrive | Average | Non-Thrive | Total |
| JK-Gr. 3 | 12 | 21 | 13 | 46 |
| SK-Gr. 4 | 42 | 43 | 27 | 112 |
| Total | 54 | 64 | 40 | 158 |

## 2. Measures

The study has included tests,[b] most of which have been outlined previously in my original report: A Longitudinal Study of Thriving, Average or Non-Thriving Kindergarten Children, 1983. Teacher rating procedures concerning social abilities, self-direction, and temperamental characteristics were also used in all grades studied. Factor analyses of these rating scales carried out by Biemiller and Richards (in preparation) on a separate sample of eight kindergarten classes, eight grade 1 classes, and eight grade 2 classes have identified the scales used for analysis in this study. Biemiller and Richard's sample included nearly all children[c] in each classroom studied. I felt that scales which proved reliable in whole classes were preferable to the a priori scales originally used in this study. (See Biemiller, 1983) The scales thus evolved included rating items which also appeared in the longitudinal study. Appendix A provides the final forms of these rating scales. Evidence obtained by Biemiller and Regan (in preparation) indicates that independent observers with four to six days' experience in a classroom can make ratings which correlate with the teachers in the .70-.80 range.

Grade 3 and 4 children were also interviewed using self-concept scales derived from Wheeler and Ladd, 1982; Harter, 1982; and Asher, Hymel, and Renshal. Unfortunately, no clear factor structure emerged from these data and they did not appear to contribute to an understanding of the children's functioning. (A report on this component of the research is attached as Appendix B).

## 3. Statistical Analysis

Analyses comparing the effects of being in one or another thrive status group were conducted using analyses of variance. The statistical significance of results refers to the likelihood that the largest difference between means in a set of means occurs by chance. (In this study, the largest difference is usually between "thrivers" and "non-thrivers".) Note that sample size affects statistical significance. Thus a mean difference which is "statistically significant" in the SK-grade 4 cohort may not be "significant" in the smaller JK-grade 3 cohort even if it is of the same magnitude.

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b. Page numbers in parentheses refer to descriptions in Biemiller, A. A Longitudinal Study of Thriving, Average or Non-Thriving Kindergarten Children, 1983. Tests administered were: CIRCUS for Kindergarten (pp. 4, 5, 15, 105); Bankson Language for grades 1 and 2 (pp. 4,15,105). WISC Vocabulary for grades 3 and 4; MAT Word Knowledge (pp. 4, 105); MAT Math Computation (pp. 4, 105); Biemiller Test of Reading Processes (pp. 21, 105); and Case, Kurland and Goldberg's Cucumber Test of Working Memory for grades 1 to 4 (pp. 4, 105).

c. All for whom parental permission was obtained.

## 4. Procedures

In each year of the study (1978, 1980, 1982), teams of testers were dispatched in May to the approximately 35 schools involved in the study. Testers were drawn from teacher-education candidates at the Institute of Child Study and were highly familiar with working with children of the age groups involved in school settings. Testing was done both in groups of three to six children at a time (CIRCUS tests, M.A.T's), and individually (Bankson language, Cucumber memory, WISC vocabulary and Biemiller reading process tests). Testers, and grade 1 to 4 teachers were not informed of prior teachers' thrive ratings or other results.

In addition to the specific ratings and tests, grade 1 to 4 teachers were asked to make "thrive ratings" of each study child by considering their class as divided into three equal groups: those most thriving in terms of their goals, those making average progress, and those not yet thriving in terms of their goals. Individual children were then assigned to one of the three groups.

## RESULTS

### Overview

Achievement differences were greater for the SK-4 cohort, but still significant for the JK-3 cohort. Rating differences were of the same magnitude for both cohorts. This represents a shift towards larger differences for the JK-3 cohort which had not shown many significant differences between the three groups in grade one.

Further analysis of the results concerned children who were perceived by grade 3 and 4 teachers to have changed in thrive status versus those who did not. Children "shifting" between average and thriving status or vice versa had corresponding changes in achievement tests and teacher ratings. However, children seen as shifting from non-thriving to average status did not show corresponding achievement test results. Teacher ratings of grade 4 children who shifted status were the same as "consistent average" children. Contrary results were found in grade 3 but with very small (N=7, 3) samples. Kindergarten test and rating data were not predictive of changes in grades 3 or 4.

These results continue to support aspects of the "thrive" concept described in the earlier report and other sources. In brief, these findings indicate the existence of continuing relationships between school achievement, self-directive capacities, and at least two temperamental characteristics: resistance to distraction and risk-taking. Two other characteristics, social abilities and resistance to frustration have less of a relationship with other aspects of functioning by grades 3 or 4. In terms of early identification, the broad classifications of "thriving", "average", and "non-thriving" in kindergarten continued to be related to functioning four years later. However, some of the variation in these was not predictable.

Practical implications include a continued need for classroom teachers to adapt programs to differences in self-direction and risk-taking, and a need for a further look at the meaning of perceived changes in the status of non-thriving children.

### Summary of Differences Associated With Kindergarten Thrive Status

Briefly, children perceived in junior or senior kindergarten as "thriving", "average", or "non-thriving" continued to show marked differences in academic performance and in teacher rated self-direction, resistance to distraction, and risk-taking. Indeed, junior kindergarten ratings were generally more predictive of grade 3 functioning than grade 1 functioning. Children's rated social abilities and resistance to frustration ceased to be related to the thrive - non-thrive groups, although we shall see in Section B that these characteristics continued to be associated with persistent non-thriving status.

## Summary of Changes in Thrive Status

A considerable proportion of children were seen by grade 3 or 4 teachers as being in a different thrive category than kindergarten. In general, these shifts involved changing one category (e.g. from non-thrive to average). Very few children were seen as shifting to non-thrive status.

Children seen as shifting between average and thriving status generally had higher achievement test scores than consistent average children. Similarly, children perceived as shifting from thrive to average status had lower achievement scores than consistent thrivers. Teacher ratings for these children also corresponded to changes in perceived status.

However, children seen as shifting from non-thriving to average status did not differ from consistent non-thrivers in academic performance. Children in the SK-4 cohort did receive more positive teacher ratings in grade 4. Children in the JK-3 cohort who shifted from non-thrive to average status did not differ from consistent non-thrivers in ratings.

Tests and ratings in kindergarten failed to discriminate between children who changed status and those who did not.

A. Differences Associated with Kindergarten Thrive Ratings

Working Memory

Case, Kurland, and Goldberg's (1982) Cucumber test is indicative of the maturation of working memory for concrete operations and is generally associated with the development of concrete operational thinking as described by Piaget (1970). This test was administered in grades 1, 2, 3, and 4. Table 1 shows that non-thrivers generally obtained slightly lower scores than other children.

Table 1
Mean Working Memory for Concrete Operations Scores
by Grade and Kindergarten Thrive Status.
(Standard Deviations in Parentheses)

| | Kindergarten Thrive Status | | | |
|---|---|---|---|---|
| | Thrive | Average | Non-Thrive | Sig. Level |
| Grade 1 | 2.5 (.7) | 2.3 (.6) | 2.1 (.8) | NS |
| Grade 2 | 2.5 (.6) | 2.3 (.5) | 2.0 (.6) | .00 |
| Grade 3 | 3.1 (.7) | 3.1 (.6) | 3.2 (.6) | NS |
| Grade 4 | 3.5 (.4) | 3.4 (.5) | 3.1 (.7) | .01 |

## Language

Different language tests were used in each test period (JK and SK; Grades 1 and 2: Grades 3 and 4). In each case small but statistically significant differences were found both in tests of vocabulary and tests of "functional language" or use of grammar (latter not given to grades 3 and 4). Results are shown in tables 2A, 2B, and 2C.

Table 2A
Kindergarten Language Tests
by Grade and Kindergarten Thrive Status.
(Standard Deviations in Parentheses)

| | Kindergarten Thrive Status | | | |
|---|---|---|---|---|
| | Thrive | Average | Non-Thrive | Sig. Level |
| CIRCUS Pencil[a] | | | | |
| Jr. Kg. | 3.0 (1.3) | 2.9 (1.1) | 2.6 (1.4) | NS |
| Sr. Kg. | 4.1 (1.4) | 4.0 (1.4) | 3.4 (1.5) | .05 |
| CIRCUS Functioning[b] | | | | |
| Jr. Kg. | 54.3 (6.8) | 49.8 (7.7) | 44.4 (10.8) | .00 |
| Sr. Kg. | 59.9 (6.9) | 57.9 (8.0) | 51.1 ( 8.9) | .00 |

a. The "pencil" test assesses how many descriptive terms are used in describing a pencil.

b. The "functional language" assesses the use of correct grammatical forms (plurals, tenses, etc.) in describing objects and actions. It is similar to the Bankson Language Test.

Table 2B

Bankson Language Tests

by Grade and Kindergarten Thrive Level.

| | Kindergarten Thrive Status | | | |
|---|---|---|---|---|
| | Thrive | Average | Non-Thrive | Sig. Level |
| Vocabulary | | | | |
| Gr. 1 | 87% | 85% | 75% | .00 |
| Gr. 2 | 90% | 88% | 83% | .00 |
| Functional Language | | | | |
| Gr. 1 | 91% | 86% | 79% | .01 |
| Gr. 2 | 96% | 93% | 84% | .01 |

Table 2C

WISC Vocabulary Subscores

by Grade and Kindergarten Thrive Level.

(Standard Deviations in Parentheses)

| | Kindergarten Thrive Status | | | |
|---|---|---|---|---|
| | Thrive | Average | Non-Thrive | Sig. Level |
| Gr. 3 | 27.3 (6.9) | 27.7 (4.3) | 23.6 (5.8) | .10 |
| Gr. 4 | 33.6 (9.1) | 32.0 (5.5) | 27.2 (5.6) | .00 |

## Academic Test Scores

In kindergarten a test of mathematical knowledge (CIRCUS How Much and How Many) yielded meaningful differences between the children. These are shown in Table 3. Non-thrivers differed significantly from others.

Table 3
CIRCUS How Much and How Many
by Grade and Kindergarten Thrive Status.
(Standard Deviations in Parentheses)

| | Kindergarten Thrive Status | | | |
|---|---|---|---|---|
| | Thrive | Average | Non-Thrive | Sig. Level |
| Jr. Kg. | 31.8 (3.2) | 28.0 (4.9) | 24.1 (6.7) | .00 |
| Sr. Kg. | 37.5 (2.1) | 36.0 (3.6) | 31.4 (4.8) | .00 |

In grades 1 to 4 M.A.T. results are available in grade equivalent terms (except for grade 1 math computation). In all cases, there are differences associated with kindergarten teachers' thrive ratings, generally amounting to one to two grade levels. (See Table 4).

Table 4

Metropolitan Achievement Test Results

by Grade and Kindergarten Thrive Status.

(Grade Equivalents, no Standard Deviations)

| | Kindergarten Thrive Status | | | |
|---|---|---|---|---|
| | Thrive | Average | Non-Thrive | Sig. Level |
| Grade 1 | | | | |
| Word Knowl. | 2.3 | 2.0 | 1.8 | .02 |
| Math. Comp. | ina | ina | ina | |
| Grade 2 | | | | |
| Word Knowl. | 3.4 | 2.9 | 2.5 | .00 |
| Math. Comp. | 3.3 | 2.7 | 2.3 | .00 |
| Grade 3 | | | | |
| Word Knowl. | 4.6 | 3.9 | 3.3 | .00 |
| Math. Comp. | 4.1 | 3.8 | 3.3 | .04 |
| Grade 4 | | | | |
| Word Knowl. | 5.8 | 4.8 | 3.9 | .00 |
| Math. Comp. | 4.9 | 4.4 | 3.8 | .00 |

Results from the Biemiller Test of Reading Processes consistently indicate that thrivers were both more constitutionally developed for reading at all grade levels (as indicated by oral reading time for letters) and more skilled in identifying words (as indicated by oral reading time for words). There is little evidence that they made better use of context (as indicated by the difference between words and text times). (See table 5).

Table 5

Letter, Word, and Text Times

by Grade and KIndergarten Thrive Status.

(Standard Deviations in Parentheses.)

| | Kindergarten Thrive Status | | | |
|---|---|---|---|---|
| | Thrive | Average | Non-Thrive | Sig. Level |
| Gr. 1 | | | | |
| Letters | 0.86 (.22) | 1.03 (.34) | 1.11 (.40) | .05 |
| Gr. 2 | | | | |
| Letters | 0.65 (.13) | 0.71 (.14) | 0.90 (.22) | .01 |
| Words | 0.72 (.19) | 0.84 (.20) | 1.11 (.51) | .01 |
| Text | 0.43 (.11) | 0.54 (.16) | 0.83 (.30) | .01 |
| Gr. 3 | | | | |
| Letters | .55 (.10) | .65 (.17) | .66 (.13) | NS |
| Words | .67 (.16) | .81 (.26) | .88 (.25) | .10 |
| Text | .41 (.10) | .51 (.18) | .58 (.20) | .05 |
| Gr. 4 | | | | |
| Letters | .50 (.08) | .54 (.08) | .62 (.14) | .00 |
| Words | .56 (.11) | .62 (.13) | .75 (.15) | .00 |
| Text | .32 (.08) | .38 (.12) | .46 (.11) | .00 |

## Social Abilities

Differences in social abilities, as rated by grade 3 and 4 teachers, have only a slight relationship to kindergarten thrive ratings. Differences of 0.7 rating scale points in the JK-3 cohort were non-significant, while 0.5 points in the SK-4 cohort approach significance.

Table 6
Social Abilities
by Kindergarten Thrive Status and Grade
(Standard Deviations in Parentheses)

| | JK | SK | Gr.1 | Gr.2 | Gr.3 | Gr.4 |
|---|---|---|---|---|---|---|
| Thrive | 4.2 (0.5) | 4.1 (0.5) | 4.1 (0.6) | 4.1 (0.6) | 3.9 (0.8) | 4.1 (0.7) |
| Average | 4.1 (0.4) | 3.8 (0.7) | 4.1 (0.6) | 4.0 (0.8) | 3.7 (1.0) | 3.8 (0.8) |
| Non-Thrive | 3.3 (0.7) | 3.6 (0.7) | 3.6 (0.9) | 3.5 (0.9) | 3.2 (1.0) | 3.6 (0.8) |
| Sig. Level | .00 | .00 | NS | .00 | NS | .08 |

## Self-Direction and Resistance to Distraction

The Resistance to Distraction Scale (derived from Thomas and Chess, 1977) consistently discriminated thrivers from non-thrivers although the magnitude of difference shifted from 1.5 to 2.0 rating points in kindergarten to about 0.8 rating points in grades 1-4, (excepting grade 1). (Table 7) This scale is similar to but not the same as the self-direction subscales. One of these subscales, self-confidence, was given in kindergarten. The other three were given only in grades 1-4. Thrive differences generally exceeded 1.0 rating points on these subscales and on the combined self-direction scale (except for grade 1). This was true both for the "free-time" (self initiative) and more teacher-set aspects of self-direction. (Table 8) Differences between "average" and "thriving" children were not as large as differences between "average" and "non-thriving" children.

Table 7
Resistance to Distraction
Kindergarten Thrive Ratings and Grade.
(Standard Deviations in Parentheses.)

| | Grade | | | | | |
|---|---|---|---|---|---|---|
| Kindergarten Thrive Status | JK | SK | Gr.1 | Gr.2 | Gr.3 | Gr.4 |
| Thrive | 3.9 (0.7) | 4.2 (0.6) | 3.8 (0.6) | 3.9 (0.7) | 4.0 (0.6) | 3.9 (0.7) |
| Average | 3.5 (0.7) | 3.6 (0.9) | 3.4 (0.8) | 3.6 (1.0) | 3.7 (1.1) | 3.7 (0.9) |
| Non-Thrive | 2.5 (0.8) | 2.2 (0.9) | 3.4 (0.8) | 2.6 (0.9) | 3.2 (1.1) | 3.1 (1.0) |
| Sig. Level | .00 | .00 | NS | .00 | NS | .00 |

Table 8
Self-Direction Ratings by
Kindergarten Thrive Status and Grade
(Standard Deviations in Parentheses)

| | Grade | | | | | |
|---|---|---|---|---|---|---|
| | JK | SK | Gr.1 | Gr.2 | Gr.3 | Gr.4 |
| | | | Self-Direction - Total | | | |
| Thrive | na | na | 4.2 (0.5) | 4.5 (0.5) | 4.4 (0.6) | 4.3 (0.7) |
| Average | na | na | 4.0 (0.6) | 4.0 (0.7) | 3.8 (1.0) | 3.9 (0.7) |
| Non-Thrive | na | na | 3.5 (0.8) | 3.0 (0.9) | 3.1 (0.8) | 3.1 (1.0) |
| Sig. level | na | na | .03 | .00 | .00 | .00 |
| | | | Free Time - subscale | | | |
| Thrive | na | na | 4.2 (0.8) | 4.5 (0.7) | 4.4 (0.8) | 4.2 (0.9) |
| Average | na | na | 4.0 (0.8) | 3.8 (1.0) | 3.8 (1.3) | 3.7 (0.9) |
| Non-Thrive | na | na | 3.3 (1.4) | 2.8 (1.2) | 3.0 (0.9) | 2.9 (1.3) |
| Sig. level | na | na | .09 | .00 | .01 | .00 |
| | | | Self Confidence - subscale | | | |
| Thrive | 4.2 (0.7) | 4.5 (0.5) | 4.0 (0.7) | 4.3 (0.6) | 4.3 (0.7) | 4.3 (0.6) |
| Average | 3.8 (0.5) | 3.8 (0.8) | 3.9 (0.9) | 3.9 (0.7) | 3.9 (0.9) | 3.8 (0.7) |
| Non-Thrive | 3.1 (0.1) | 2.9 (0.8) | 3.7 (0.5) | 3.2 (0.7) | 3.2 (0.5) | 3.2 (0.9) |
| Sig. level | .00 | .00 | NS | .00 | .01 | .00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Academic Routines - subscale** | | | | | | |
| Thrive | na | na | 4.2 (0.7) | 4.4 (0.7) | 4.1 (1.1) | 4.2 (1.0) |
| Average | na | na | 3.7 (1.1) | 3.8 (1.1) | 3.3 (1.3) | 3.8 (0.9) |
| Non-Thrive | na | na | 3.1 (1.0) | 2.8 (1.2) | 2.9 (1.4) | 2.7 (1.3) |
| Sig. level | na | na | .03 | .00 | .06 | .00 |
| **Teacher-set Tasks - subscale** | | | | | | |
| Thrive | na | na | 4.2 (0.8) | 4.6 (0.5) | 4.6 (0.5) | 4.4 (0.8) |
| Average | na | na | 3.9 (0.9) | 4.2 (0.8) | 4.2 (1.0) | 4.3 (0.8) |
| Non-Thrive | na | na | 3.6 (0.9) | 3.2 (1.3) | 3.5 (1.0) | 3.6 (1.1) |
| Sig. level | na | na | NS | .00 | .02 | .00 |

Resistance to Frustration

Kindergarten thrive status was related to differences in this variable in kindergarten and grade 2, but not grades 1, 3 or 4. Differences were larger in the activity level and classroom management components of the scale, than in the negative mood component. The disappearance of differences by grade 3 or 4 suggests either that differences tapped by this scale are outgrown by middle childhood or that this scale taps negative reactions which are experienced less or controlled better by middle childhood. We shall see that children who continue to be seen as non-thrivers over the four-year period may continue to have low scores on reactions to frustration.

Table 9

Resistance to Frustration

by Kindergarten Thrive Status and Grade

(Standard Deviations in Parentheses)

| | Grade | | | | | |
|---|---|---|---|---|---|---|
| | JK | SK | Gr.1 | Gr.2 | Gr.3 | Gr.4 |
| | | | Resist Frustration - Total[a] | | | |
| Thrive | 4.3 (0.7) | 4.1 (0.7) | 4.3 (0.4) | 4.3 (0.7) | 4.3 (0.5) | 4.0 (0.9) |
| Average | 4.1 (0.5) | 3.9 (0.8) | 3.9 (0.8) | 4.0 (0.9) | 4.2 (0.9) | 4.1 (0.7) |
| Non-Thrive | 3.3 (1.0) | 3.1 (1.0) | 3.8 (0.6) | 3.4 (1.0) | 4.0 (0.8) | 3.8 (0.9) |
| Sig. level | .00 | .01 | NS | .00 | NS | NS |
| | | | Negative Mood - subscale | | | |
| Thrive | 4.1 (0.9) | 3.9 (0.8) | 4.2 (0.6) | 4.2 (0.8) | 4.4 (0.6) | 4.0 (0.9) |
| Average | 4.0 (0.5) | 3.9 (0.8) | 3.9 (0.9) | 4.1 (0.9) | 4.1 (1.1) | 4.1 (0.9) |
| Non-Thrive | 3.6 (1.0) | 3.3 (1.7) | 3.6 (0.8) | 3.6 (1.1) | 4.2 (0.7) | 4.0 (0.9) |
| Sig. level | NS | .01 | NS | .01 | NS | NS |
| | | | Classroom Management - subscale | | | |
| Thrive | na | na | 4.3 (0.6) | 4.4 (0.8) | 4.0 (0.7) | 4.0 (1.1) |
| Average | na | na | 4.2 (0.9) | 4.1 (0.9) | 4.0 (1.0) | 4.0 (1.0) |
| Non-Thrive | na | na | 3.6 (1.1) | 3.3 (1.3) | 3.8 (1.0) | 3.6 (1.2) |
| Sig. level | na | na | NS | .00 | NS | NS |
| | | | Activity Level - subscale | | | |
| Thrive | 4.5 (0.7) | 4.4 (0.8) | 4.5 (0.6) | 4.4 (0.8) | 4.4 (0.8) | 4.1 (1.0) |
| Average | 3.7 (0.9) | 3.9 (0.9) | 3.9 (0.9) | 3.8 (1.1) | 4.4 (1.0) | 4.1 (1.0) |
| Non-Thrive | 2.7 (1.4) | 2.8 (1.2) | 3.7 (0.9) | 3.2 (1.1) | 3.7 (1.1) | 3.7 (1.2) |

a. "Resistance to frustration" equals the combined scores of the negative mood, classroom management (grade one up), and activity level subscales.

Risk-Taking

The risk-taking scale has two components - performance in adult-led group situations (essentially "risking" adult or peer disapproval), and Thomas and Chess's approach-withdrawal items having to do with approaching new situations. Intriguingly, kindergarten ratings on this scale continue to differentiate children well into middle childhood by about 1 rating scale point.

Table 10
Risk-Taking
by Kindergarten Thrive Status and Grade
(Standard Deviations in Parentheses)

| | Grade | | | | | |
|---|---|---|---|---|---|---|
| | JK | SK | Gr.1 | Gr.2 | Gr.3 | Gr.4 |
| | | | Risk-Taking - Total | | | |
| Thrive | 4.3 (0.7) | 4.3 (0.5) | 3.9 (0.7) | 4.3 (0.4) | 4.4 (0.4) | 4.2 (0.7) |
| Average | 3.8 (0.7) | 3.8 (0.7) | 3.9 (0.6) | 4.0 (0.7) | 4.0 (0.9) | 4.0 (0.8) |
| Non-Thriving | 2.9 (0.9) | 3.1 (0.9) | 3.5 (0.6) | 3.2 (0.7) | 3.3 (0.9) | 3.5 (0.9) |
| Sig. level | .00 | .00 | NS | .00 | .00 | .01 |
| | | | Adult Groups - subscale | | | |
| Thrive | 4.2 (0.7) | 4.4 (0.6) | 4.1 (0.6) | 4.4 (0.5) | 4.3 (0.5) | 4.3 (0.8) |
| Average | 4.0 (0.7) | 3.9 (0.7) | 4.1 (0.6) | 4.0 (0.7) | 4.0 (0.9) | 4.0 (0.8) |
| Non-Thrive | 3.0 (1.0) | 3.3 (0.9) | 3.6 (0.7) | 3.2 (0.9) | 3.3 (0.8) | 3.5 (0.9) |
| Sig. level | .00 | .00 | .06 | .00 | .02 | .00 |
| | | | Approach-Withdrawal - subscale | | | |
| Thrive | 4.3 (0.9) | 4.3 (0.5) | 3.6 (0.8) | 4.3 (0.6) | 4.3 (0.6) | 4.0 (0.9) |
| Average | 3.7 (0.9) | 3.7 (0.8) | 3.7 (0.7) | 4.0 (0.7) | 3.8 (0.8) | 3.9 (0.8) |
| Non-Thrive | 2.8 (1.1) | 2.9 (1.0) | 3.3 (0.7) | 3.3 (0.7) | 3.6 (1.0) | 3.5 (0.9) |
| Sig. level | .00 | .00 | NS | .00 | NS | .05 |

## B. Changes in Thrive Status

As described in the methods section, teachers in grades 1 to 4 were asked to classify children into thrive categories in terms of the most, middle and least "thriving" thirds of the class. Table 11 shows shifts in thrive categories from kindergarten to grades 1 and 2, 2 and 4, and from Grades 1 and 2 to 3 and 4.

Table 11

Changes in Thrive Status

JK-1-3 Cohort

| | | 1980 Thr. | 1980 Avg. | 1980 N.Thr. | |
|---|---|---|---|---|---|
| 1978 | Thr. | 11 | 2 | 0 | 13 |
| | Avg. | 12 | 5 | 4 | 21 |
| | Non-Thr. | 2 | 8 | 3 | 13 |
| | | 25 | 15 | 7 | |

| | | 1982 Thr. | 1982 Avg. | 1982 N.Thr. | |
|---|---|---|---|---|---|
| 1978 | Thr. | 9 | 3 | 0 | 12 |
| | Avg. | 13 | 5 | 2 | 20 |
| | Non-Thr. | 2 | 7 | 3 | 12 |
| | | 24 | 15 | 5 | |

| | | 1982 Thr. | 1982 Avg. | 1982 N.Thr. | |
|---|---|---|---|---|---|
| 1980 | Thr. | 19 | 4 | 0 | 23 |
| | Avg. | 4 | 8 | 2 | 14 |
| | Non-Thr. | 1 | 3 | 3 | 7 |
| | | 24 | 15 | 5 | |

SK-2-4 Cohort

| | | 1980 Thr. | 1980 Avg. | 1980 N.Thr. | |
|---|---|---|---|---|---|
| 1978 | Thr. | 32 | 9 | 0 | 41 |
| | Avg. | 21 | 20 | 1 | 42 |
| | Non-Thr. | 1 | 16 | 9 | 26 |
| | | 54 | 45 | 10 | |

| | | 1982 Thr. | 1982 Avg. | 1982 N.Thr. | |
|---|---|---|---|---|---|
| 1978 | Thr. | 32 | 9 | 0 | 41 |
| | Avg. | 23 | 18 | 1 | 42 |
| | Non-Thr. | 2 | 14 | 9 | 25 |
| | | 57 | 41 | 10 | |

| | | 1982 Thr. | 1982 Avg. | 1982 N.Thr. | |
|---|---|---|---|---|---|
| 1980 | Thr. | 41 | 13 | 0 | 54 |
| | Avg. | 15 | 22 | 5 | 42 |
| | Non-Thr. | 0 | 5 | 5 | 10 |
| | | 56 | 40 | 10 | |

Overall, there is clearly a tendency for teachers to classify "high" when placing only a few members of a class into "thirds" of a class. However, as we shall see, there is also some validity to their upward shifting. We will begin by examining grade 3 or 4 tests and ratings by changes in "thrive status" between 1978 and 1982. (Table 12)

Table 12
Grade 3 and 4 Test Scores
by Stability or Change in Thrive Status
(Standard Deviations in Parentheses)

| | Stability or Change in Thrive Rating | | | | | | |
|---|---|---|---|---|---|---|---|
| | Consist. Thrive | Average to Thrive | Thrive to Average | Consist. Average | N. Thrive to Avg. | Consist. N. Thrive | Sig. Level |
| Number of Cases | | | | | | | |
| JK-3 | 9 | 13 | 3 | 5 | 7 | 7 | |
| SK-4 | 32 | 21 | 8 | 19 | 15 | 9 | |
| Vocabulary | | | | | | | |
| JK-3 | 26.5(7.7) | 27.4(4.4) | 29.3(6.7) | 27.8(5.6) | 22.0(6.3) | 24.3(2.5) | NS |
| SK-4 | 33.1(5.1) | 32.6(5.7) | 35.8(17.7) | 31.4(5.3) | 26.8(6.4) | 27.4(3.4) | .02 |
| M.A.T. Word Knowl. | | | | | | | |
| JK-3[a] | 5.1 | 4.5 | 3.7 | 3.8 | 3.3 | 3.1 | .08 |
| SK-4[a] | 5.6 | 5.0 | 4.6 | 4.4 | 3.8 | 3.7 | .00 |
| M.A.T. Math Comp. | | | | | | | |
| JK-3[a] | 4.3 | 3.3 | 4.6 | 3.2 | 3.2 | 2.1 | .01 |
| SK-4[a] | 5.2 | 5.0 | 4.7 | 4.2 | 3.6 | 3.5 | .00 |
| Letter Time | | | | | | | |
| JK-3 | .54(.10) | .62(.13) | .61(.10) | .70(.26) | .66(.15) | .69(.19) | .03 |
| SK-4 | .50(.07) | .53(.09) | .53(.06) | .56(12) | .65(20) | .58(.10) | .00 |
| Word Time | | | | | | | |
| JK-3 | .65(.15) | .71(16) | .76(.19) | 1.01(.40) | .87(.27) | .95(.36) | .03 |
| SK-4 | .35(.10) | .59(.14) | .61(.11) | .65(.14) | .77(.15) | .75(.15) | .00 |
| Text Time | | | | | | | |
| JK-3 | .37(.10) | .45(.11) | .49(.08) | .57(.24) | .56(.27) | .70(.19) | .03 |
| SK-4 | .31(.07) | .36(.10) | .37(.10) | .39(.14) | .47(.12) | .48(.08) | .00 |

a. Grade equivalent (no S.D. available)

Consistent thrivers and consistent non-thrivers typically differ by about two grade levels on academic assessments as we have seen in the preceding section. Children seen as shifting from non-thriving to average do not in fact do markedly better than consistent non-thrivers except for grade 3 children on mathematics and reading speed. Children seen as shifting from average to thriving status tend to fall between consistent average and consistent thrivers, except for grade 3 mathematics. Children seen as declining from thriving to average status tend also to fall between these two groups. In short, shifts in perceived thrive status are generally reflected to some degree in test results, except for kindergarten non-thrivers.

One other point is worth noting. In this sample, the range of reading performance is consistent with "word knowledge" MAT norms. That is, the most able children are typically over the 80th percentile while the least able are around the 30th to 20th percentiles. However, on math computation norms the most able are under the 70th percentile and the least able are well under the 10th percentile. Consistent "average children" are only around the 25th percentile on math compared to the 50th on reading. While the present sample is unusual in make-up and background, this observation should be checked with larger groups (and will be checked with the more random Project Thrive sample referred to in the methods section.)

Teacher-Ratings in Grades 3 and 4 by Thrive Changes

Table 13 shows ratings in grades 3 and 4 associated with changes in perceived thrive status. We have seen that there is a general tendency for test scores of children who shift to fall between the scores of children perceived as consistently thriving, average, and non-thriving. What about their ratings?

Table 13
Grade 3-4 Mean Teacher Ratings
By Stability or Change in Thrive Status
(Standard Deviations in Parentheses)

| | Stability or Change in Thrive Status | | | | | | |
|---|---|---|---|---|---|---|---|
| | Consist. Thrive | Average to Thrive | Thrive to Average | Consist. Average | N. Thrive to Avg. | Consist. N. Thrive | Sig. Level |
| Number of Cases | | | | | | | |
| JK-3 | 9 | 13 | 3 | 5 | 7 | 3 | |
| SK-4 | 32 | 21 | 8 | 19 | 15 | 19 | |
| Resis. Distr. | | | | | | | |
| JK-3 | 4.2(.5) | 4.4(.6) | 3.5(.4) | 3.2(.8) | 3.1(1.1) | 2.8(1.1) | .01 |
| SK-4 | 4.0(.7) | 3.9(.9) | 3.6(.7) | 3.4(.8) | 3.3( .9) | 2.4(1.1) | .00 |
| Self Dir. | | | | | | | |
| JK-3 | 4.5(.5) | 4.4(.6) | 3.8(.5) | 3.2(.7) | 2.8( .5) | 3.0( .4) | .00 |
| SK-4 | 4.3(.7) | 4.3(.4) | 4.0(.5) | 3.7(.5) | 3.5( .6) | 2.2( .7) | .00 |
| Resis.Frus. | | | | | | | |
| JK-3 | 4.4(.5) | 4.4(.7) | 3.8(.2) | 4.1(.7) | 3.6( .8) | 4.3( .6) | NS |
| SK-4 | 4.0(1.1) | 4.2(.9) | 4.1(.6) | 4.0(.8) | 4.1( .7) | 3.0(1.1) | NS |
| Risk-Taking | | | | | | | |
| JK-3 | 4.5(.4) | 4.3(.7) | 3.9(.1) | 3.3(.8) | 3.1( .7) | 3.6( .8) | .00 |
| SK-4 | 4.3(.7) | 4.2(.8) | 3.9(.9) | 3.7(.8) | 3.5( .8) | 3.0( .9) | .00 |
| Social Abil. | | | | | | | |
| JK-3 | 4.1(.6) | 4.0(.9) | 3.2(1.0) | 3.7( .9) | 2.3( .4) | 3.9( .3) | .00 |
| SK-4 | 4.1(.7) | 4.1(.6) | 4.1( .6) | 3.6(1.0) | 3.7( .6) | 3.2(1.2) | .07 |

Children shifting from non-thrive to average status differ in the two cohorts. The JK-3 cohort show no effect or a negative one (i.e. consistent non-thrivers received higher ratings than those shifting to average.) In the SK-4 cohort results were more as expected, with children who were perceived as average in grade 4 receiving more positive ratings. The anomolous grade 3 results may be due to the very small (n=3) sample of consistent non-thrivers.

Among children shifting between average and thriving status (in either direction) ratings are consistent with shifts.

## Kindergarten Precursors of Changes in Thrive Status in Grades 3 and 4

Table 14 shows fairly consistently that non-thrivers in kindergarten who changed in grades 3 or 4 did not differ meaningfully in most of their kindergarten ratings or tests from consistent non-thrivers. Children shifting from average to thrive status were given higher ratings on Resisting Distraction, and Resisting Frustration (SK-4 only). Other results are nil or inconsistent. Overall, these results do not improve on the pattern reported in the previous section, that on average, kindergarten non-thrivers do less well in grades 3 and 4 than others. Neither the tests nor ratings used permit further differentiation between children who improved or slipped over the years and those who did not.

Table 14

Kindergarten Precursors of Gr. 3 or Gr. 4

Stability or Changes in Thrive Status

| | Stability or Changes from Kindergarten to Gr. 3/4 Status | | | | | | |
|---|---|---|---|---|---|---|---|
| | Consist. Thrive | Average to Thrive | Thrive to Average | Consist. Average | N. Thrive to Avg. | Consist. N. Thrive | Sig. Level |
| Number of Cases | | | | | | | |
| JK-3 | 9 | 13 | 3 | 5 | 7 | 3 | |
| SK-4 | 27 | 19 | 7 | 13 | 13 | 7 | |
| Func. Language | | | | | | | |
| JK-3 | 52.7 | 50.7 | 61.3 | 44.2 | 40.3 | 51.0 | .01 |
| SK-4 | 59.1(7.1) | 57.0(9.0) | 59.5(6.4) | 57.4(7.8) | 49.2(8.4) | 50.8(7.8) | .00 |
| How Much Test | | | | | | | |
| JK-3 | 30.2 | 28.2 | 34.3 | 25.6 | 22.6 | 24.3 | .01 |
| SK-4 | 38.09(1.5) | 36.4(2.5) | 36.4(2.3) | 35.6(3.4) | 31.4(5.8) | 30.0(5.5) | .00 |
| Social Abil. | | | | | | | |
| JK-3 | 4.3 ( .5) | 4.2( .3) | 4.5( .4) | 3.8( .4) | 3.0( .7) | 3.1( .9) | .00 |
| SK-4 | 4.1 ( .6) | 3.8( .7) | 4.2( .4) | 4.0( .6) | 3.6( .7) | 3.6( .5) | .07 |
| Resis. Distr. | | | | | | | |
| JK-3 | 4.0 ( .4) | 3.7( .6) | 3.5( .3) | 3.4( .4) | 2.8( .8) | 1.6( .7) | .00 |
| SK-4 | 4.1 ( .7) | 3.7( .7) | 4.0( .7) | 2.8( .9) | 2.1( .9) | 2.1(1.3) | .00 |
| Self. Confid. | | | | | | | |
| JK-3 | 4.4 ( .5) | 4.0( .5) | 4.3( .9) | 3.3( .6) | 3.1( .7) | 2.7( .9) | .00 |
| SK-4 | 4.5 ( .5) | 3.7( .6) | 4.5( .5) | 3.8( .7) | 2.8( .7) | 3.0( .9) | .00 |
| Resis. Frus. | | | | | | | |
| JK-3 | 4.7 ( .3) | 4.0(0.6) | 4.4( .3) | 4.1( .6) | 3.6(1.0) | 3.0(1.2) | .01 |
| SK-4 | 4.2 ( .6) | 4.1( .9) | 3.7( .8) | 3.6( .7) | 3.1(1.1) | 3.6( .8) | .00 |
| Risk Taking | | | | | | | |
| JK-3 | 4.2 ( .9) | 4.0( .8) | 4.5( .01) | 3.6( .8) | 2.5( .8) | 2.7( .06) | .00 |
| SK-4 | 4.4 ( .4) | 3.6( .6) | 4.4( .4) | 4.0( .8) | 3.2(1.0) | 2.7( .0) | .00 |

C. Correlations Between Measures

Tables 15, 16, and 17 show concurrent correlations between measures in junior and senior kindergartens; grades 1 and 2; and grades 3 and 4 respectively. Inspection of these tables indicates:

1. In general, correlations among tests and among ratings are higher than correlations between tests and ratings, (except for language tests).

2. The most substantial concurrent correlations between ratings and tests are between either self-direction or resistance to distraction and academic tests.

3. It is noteworthy that while very similar patterns of correlations between ratings occurred in grades 3 and 4, considerably lower correlations were found between grade 4 tests and ratings than between grade 3 tests and ratings. This suggests, that while the same behavioral characteristics remain related during those years, that academic skills may be growing less closely related to behavioral characteristics. This could reflect the growing effects of "cumulative deficits and gains" (Bloom, 1976) independent of behavior.

Table 15

Concurrent Relationships Between

Tests and Rating Variables: Kindergarten

| | | Tests | | Ratings | | | | |
|---|---|---|---|---|---|---|---|---|
| | Thrive Rating | How Much | Func. Lang. | Soc. Abil. | Self Conf. | Resis. Distr. | Resis. Frus. | Risk Taking |
| Thrive | | | | | | | | |
| JK | x | .52 | .42 | .53 | .59 | .62 | .44 | .57 |
| SK | x | .54 | .39 | .36 | .72 | .71 | .41 | .59 |
| How Much | | | | | | | | |
| JK | .52 | x | .66 | .37 | .44 | .53 | .36 | .37 |
| SK | .55 | x | .48 | .27 | .45 | .50 | .35 | .42 |
| Func. Lang. | | | | | | | | |
| JK | .42 | .66 | x | .37 | .39 | .23 | .11 | .31 |
| SK | .39 | .48 | x | .17 | .29 | .28 | .08 | .27 |
| Soc. Abil. | | | | | | | | |
| JK | .53 | .37 | .37 | x | .70 | .42 | .48 | .54 |
| SK | .35 | .27 | .17 | x | .55 | .42 | .46 | .60 |
| Self Conf. | | | | | | | | |
| JK | .59 | .44 | .39 | .70 | x | .65 | .38 | .55 |
| SK | .72 | .45 | .29 | .55 | x | .72 | .49 | .76 |
| Resis. Distr. | | | | | | | | |
| JK | .62 | .53 | .23 | .42 | .65 | x | .70 | .44 |
| SK | .71 | .50 | .28 | .42 | .72 | x | .72 | .54 |
| Resis. Frus. | | | | | | | | |
| JK | .44 | .36 | .11 | .48 | .38 | .70 | x | .26 |
| SK | .41 | .35 | .08 | .46 | .49 | .72 | x | .31 |
| Risk Taking | | | | | | | | |
| JK | .57 | .37 | .31 | .54 | .55 | .44 | .26 | x |
| SK | .59 | .42 | .27 | .60 | .76 | .54 | .31 | x |

Table 16
Concurrent Relationships Between Tests and Rating Variables: Grades 1 and 2

| | Kg. Thrive Rating | Tests: Vocab. | Tests: Func. Lang. | Tests: MAT W.K. | Tests: MAT Math. C. | Tests: Letter Time | Tests: Text Time | Ratings: Soc. Abil. | Ratings: Self Dir. | Ratings: Resis. Distr. | Ratings: Resis. Frus. | Ratings: Risk Taking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kg. Thrive | | | | | | | | | | | | |
| 1 | x | .51 | .44 | .39 | .03 | .27 | .14 | .25 | .41 | .20 | .27 | .24 |
| 2 | x | .39 | .47 | .59 | .60 | .37 | .56 | .34 | .63 | .49 | .39 | .55 |
| Vocabulary | | | | | | | | | | | | |
| 1 | .51 | x | .47 | .30 | .13 | .15 | .01 | .04 | .15 | .15 | .19 | .27 |
| 2 | .39 | x | .51 | .36 | .35 | .37 | .35 | .24 | .37 | .20 | .16 | .38 |
| Func. Lang. | | | | | | | | | | | | |
| 1 | .44 | .48 | x | .38 | .19 | .07 | .20 | .13 | .18 | .32 | .36 | .27 |
| 2 | .47 | .51 | x | .45 | .39 | .34 | .37 | .11 | .31 | .19 | .12 | .33 |
| Word K. | | | | | | | | | | | | |
| 1 | .39 | .30 | .38 | x | .16 | .56 | .80 | .02 | .44 | .36 | .26 | .30 |
| 2 | .59 | .36 | .45 | x | .63 | .46 | .73 | .17 | .53 | .48 | .35 | .44 |
| Math. C. | | | | | | | | | | | | |
| 1 | .03 | .13 | .19 | .16 | x | .48 | .38 | -.07 | -.24 | .39 | .36 | -.06 |
| 2 | .60 | .35 | .39 | .43 | x | .31 | .48 | .03 | .44 | .42 | .27 | .42 |
| Letter T. | | | | | | | | | | | | |
| 1 | .27 | -.15 | -.08 | .56 | .48 | x | .46 | .28 | .19 | .32 | .38 | .28 |
| 2 | .37 | .37 | .34 | .46 | .31 | x | .66 | .37 | .44 | .42 | .34 | .39 |
| Text T. | | | | | | | | | | | | |
| 1 | .14 | -.01 | -.20 | .80 | .38 | .46 | x | .02 | .17 | .42 | .33 | .21 |
| 2 | .56 | .35 | .37 | .73 | .48 | .66 | x | .39 | .64 | .56 | .48 | .48 |
| Soc. Abil. | | | | | | | | | | | | |
| 1 | .25 | .04 | .13 | .02 | -.07 | .28 | .02 | x | .41 | .18 | .34 | .51 |
| 2 | .34 | .24 | .11 | .17 | .03 | .37 | .39 | x | .53 | .43 | .47 | .54 |
| Self Dir. | | | | | | | | | | | | |
| 1 | .41 | .15 | .18 | .43 | -.23 | .19 | .16 | .41 | x | .57 | .62 | .51 |
| 2 | .63 | .37 | .31 | .53 | .44 | .49 | .64 | .53 | x | .75 | .68 | .61 |
| Resis. Distr. | | | | | | | | | | | | |
| 1 | .20 | .17 | .32 | .36 | .39 | .32 | .42 | .18 | .57 | x | .64 | .22 |
| 2 | .49 | .20 | .19 | .48 | .41 | .42 | .56 | .43 | .75 | x | .84 | .49 |
| Resis. Frus. | | | | | | | | | | | | |
| 1 | .27 | .19 | .36 | .26 | .36 | .38 | .33 | .54 | .62 | .64 | x | .32 |
| 2 | .39 | .17 | .12 | .35 | .27 | .34 | .48 | .47 | .68 | .84 | x | .29 |
| Rist Taking | | | | | | | | | | | | |
| 1 | .24 | .27 | .26 | .30 | -.06 | .28 | .21 | .51 | .51 | .22 | .32 | x |
| 2 | .55 | .38 | .33 | .44 | .42 | .39 | .48 | .54 | .61 | .49 | .29 | x |

Table 17
Concurrent Relationships Between Tests and Rating Variables: Grades 3 and 4

| | Kg. Thrive Rating | Tests Vocab. | MAT WK | MAT Math. | Letter Time | Text Time | Ratings Soc. Abil. | Self Dir. | Resis. Distr. | Resis. Frus. | Risk Taking |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Kg. Thrive** | | | | | | | | | | | |
| 3 | x | .24 | .36 | .38 | .27 | .36 | .26 | .49 | .29 | .16 | .44 |
| 4 | x | .32 | .43 | .49 | .40 | .47 | .25 | .47 | .34 | .08 | .32 |
| **Vocabulary** | | | | | | | | | | | |
| 3 | .24 | x | .54 | .53 | .13 | .28 | .25 | .41 | .11 | .02 | .40 |
| 4 | .32 | x | .39 | .33 | .30 | .38 | .09 | .25 | .20 | .07 | .29 |
| **MAT WK** | | | | | | | | | | | |
| 3 | .36 | .54 | x | .61 | .65 | .81 | .42 | .75 | .60 | .32 | .51 |
| 4 | .43 | .39 | x | .63 | .41 | .67 | .23 | .57 | .53 | .27 | .45 |
| **Math. C.** | | | | | | | | | | | |
| 3 | .38 | .54 | .61 | x | .40 | .54 | .34 | .63 | .51 | .30 | .55 |
| 4 | .49 | .33 | .63 | x | .44 | .51 | .20 | .43 | .27 | .06 | .38 |
| **Letter T.** | | | | | | | | | | | |
| 3 | .27 | .13 | .65 | .40 | x | .83 | .22 | .59 | .47 | .22 | .48 |
| 4 | .40 | .30 | .41 | .44 | x | .66 | .15 | .24 | .17 | .02 | .15 |
| **Text T.** | | | | | | | | | | | |
| 3 | .36 | .28 | .81 | .54 | .83 | x | .39 | .77 | .71 | .40 | .54 |
| 4 | .47 | .38 | .67 | .52 | .66 | x | .21 | .41 | .25 | .12 | .29 |
| **Soc. Abil.** | | | | | | | | | | | |
| 3 | .26 | .25 | .42 | .34 | .22 | .39 | x | .66 | .59 | .75 | .64 |
| 4 | .25 | .09 | .22 | .20 | .15 | .21 | x | .66 | .72 | .84 | .46 |
| **Self Dir.** | | | | | | | | | | | |
| 3 | .49 | .41 | .75 | .63 | .59 | .77 | .66 | x | .83 | .58 | .81 |
| 4 | .47 | .25 | .57 | .43 | .24 | .41 | .66 | x | .78 | .62 | .63 |
| **Resis. Distr.** | | | | | | | | | | | |
| 3 | .29 | .11 | .60 | .51 | .47 | .71 | .59 | .83 | x | .70 | .44 |
| 4 | .34 | .19 | .53 | .27 | .17 | .25 | .71 | .78 | x | .83 | .49 |
| **Resis. Frus.** | | | | | | | | | | | |
| 3 | .16 | .02 | .32 | .30 | .22 | .40 | .75 | .58 | .70 | x | .31 |
| 4 | .08 | .07 | .27 | .05 | .02 | .11 | .84 | .62 | .83 | x | .32 |
| **Risk Taking** | | | | | | | | | | | |
| 3 | .44 | .40 | .51 | .55 | .48 | .54 | .63 | .81 | .44 | .31 | x |
| 4 | .32 | .29 | .45 | .38 | .15 | .29 | .45 | .63 | .49 | .32 | x |

Table 18 concerns correlations between Grade 3 and 4 outcome measures and kindergarten measures. Table 19 shows the same relationships between grade 1 and 2 measures and grade 3 and 4 outcomes. The overall picture may be summarized as follows:

1. Kindergarten test scores, especially the CIRCUS How Much and How Many Test, correlated with grade 3 and 4 MAT results on the same order (.5 - .6) as did kindergarten ratings of self-confidence and resistance to distraction.

2. Ratings of social ability and resistance to frustration are not highly correlated over time. This suggests that these characteristics are more subject to change than others.

3. Ratings of self-direction (using only kindergarten self-confidence as a predictor), resistance to distraction and risk taking were all quite stable in the JK-grade 3 cohort though not in the SK-grade 4 cohort. Resistance to distraction was not stable from grade 1 to 3.

Table 18

Longitudinal Correlations Between Kindergarten Tests and Ratings and Grade 3 or 4 Tests and Ratings

| | Tests | | | | | | Ratings | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Grade 3 or 4 Measures | | | | | | | | | |
| | Thrive[b] Rating | Vocab. | MAT Reading | MAT Math. | Letter[a] Time | Text[a] Time | Soc. Abil. | Self Dir. | Resis. Distr. | Resis. Frus. | Risk Taking |
| Kg. Meas. | | | | | | | | | | | |
| Thrive R. | | | | | | | | | | | |
| JK | .45 | .24 | .36 | .38 | .27 | .36 | .26 | .49 | .29 | -.16 | .44 |
| SK | .59 | .32 | .43 | .48 | .40 | .47 | .25 | .47 | .34 | -.08 | .32 |
| CIRCUS | | | | | | | | | | | |
| How Much | | | | | | | | | | | |
| JK | .30 | .43 | .63 | .53 | .37 | .47 | .33 | .53 | .43 | .35 | .38 |
| SK | .49 | .30 | .46 | .55 | .24 | .40 | .14 | .38 | .29 | .04 | .38 |
| CIRCUS | | | | | | | | | | | |
| Func. Lang | | | | | | | | | | | |
| JK | .10 | .38 | .46 | .45 | .27 | .31 | .17 | .34 | .20 | .20 | .33 |
| SK | .22 | .46 | .28 | .31 | .19 | .39 | .19 | .25 | .15 | .07 | .31 |
| Soc. Abil. | | | | | | | | | | | |
| JK | .43 | .37 | .34 | .53 | .31 | .26 | .39 | .51 | .15 | .23 | .62 |
| SK | .10 | .05 | .12 | -.15 | .18 | .14 | .20 | .10 | .14 | .16 | .33 |
| Self Conf. | | | | | | | | | | | |
| JK | .54 | .32 | .40 | .48 | .43 | .49 | .40 | .63 | .54 | .42 | .51 |
| SK | .40 | .30 | .42 | .49 | .43 | .46 | .26 | .27 | .27 | .05 | .34 |
| Resis. Distr. | | | | | | | | | | | |
| JK | .68 | .26 | .48 | .59 | .32 | .51 | .39 | .64 | .55 | .38 | .46 |
| SK | .53 | .23 | .41 | .46 | .43 | .50 | .27 | .42 | .38 | .28 | .28 |
| Resis. Frus. | | | | | | | | | | | |
| JK | .44 | .32 | .42 | .62 | .22 | .35 | .30 | .52 | .36 | .29 | .44 |
| SK | .31 | -.07 | .16 | .30 | .27 | .27 | .23 | .22 | .33 | .26 | .10 |
| Risk Taking | | | | | | | | | | | |
| JK | .41 | .43 | .31 | .44 | .32 | .32 | .39 | .54 | .16 | .19 | .65 |
| SK | .31 | .28 | .37 | .32 | .27 | .41 | .23 | .34 | .30 | .18 | .51 |

b. Variable reflected to show positive correlation.

Table 19
Longitudinal Correlations Between
Grade 1 and 2 Tests and Ratings
and Grade 3 and 4 Tests and Ratings

| Gr. 1 or 2 Measure | Grade 3 or 4 Measures: Thrive 82 | MAT Wkng. | MAT Math C. | Letter Time | Text Time | Soc. Abil. | Self Dir. | Resis. Distr. | Resis. Frus. | Risk Taking |
|---|---|---|---|---|---|---|---|---|---|---|
| Thrive 80 | | | | | | | | | | |
| 1 | .63 | .46 | .49 | .45 | .61 | .51 | .68 | .65 | .48 | .37 |
| 2 | .59 | .62 | .57 | .46 | .58 | .32 | .61 | .44 | .15 | .44 |
| Vocabulary | | | | | | | | | | |
| 1 | .31 | .50 | .43 | .08 | .30 | .37 | .50 | .28 | .12 | .39 |
| 2 | .31 | .45 | .46 | .27 | .31 | .10 | .25 | .18 | .04 | .32 |
| M.A.T. WK. | | | | | | | | | | |
| 1 | .50 | .63 | .60 | .44 | .63 | .61 | .73 | .72 | .55 | .53 |
| 2 | .50 | .74 | .61 | .43 | .71 | .34 | .48 | .41 | .18 | .36 |
| M.A.T. Math. | | | | | | | | | | |
| 1 | .04 | .07 | .18 | .03 | .03 | .30 | .23 | -.03 | .15 | .32 |
| 2 | .49 | .50 | .62 | .34 | .41 | .28 | .42 | .40 | .18 | .38 |
| Soc. Abil. | | | | | | | | | | |
| 1 | .03 | .16 | .04 | .28 | .29 | .30 | .19 | .17 | .31 | .06 |
| 2 | .32 | .19 | .22 | .29 | .35 | .30 | .36 | .21 | .17 | .31 |
| Self Dir. | | | | | | | | | | |
| 1 | .54 | .40 | .43 | .46 | .53 | .32 | .52 | .52 | .45 | .17 |
| 2 | .65 | .53 | .54 | .49 | .53 | .42 | .63 | .50 | .28 | .47 |
| Res. Distr. | | | | | | | | | | |
| 1 | .35 | .42 | .55 | .41 | .48 | .27 | .42 | .23 | .12 | .32 |
| 2 | .50 | .39 | .38 | .42 | .50 | .56 | .52 | .51 | .36 | .25 |
| Resis. Frus. | | | | | | | | | | |
| 1 | .41 | .26 | .50 | .31 | .38 | .50 | .46 | .32 | .57 | .35 |
| 2 | .40 | .32 | .38 | .38 | .41 | .54 | .45 | .47 | .41 | .21 |
| Risk Taking | | | | | | | | | | |
| 1 | .26 | .40 | .29 | .48 | .44 | .41 | .45 | .24 | .27 | .46 |
| 2 | .50 | .39 | .40 | .33 | .42 | .29 | .47 | .33 | .10 | .53 |

Multiple regression analyses were performed to see if combinations of variables would improve predictions. The general pattern was that the addition of two to four variables would improve prediction of the best single prediction (as shown in Table 15) by 5 - 10 per cent. Improved predictions rarely involved the same variables in both cohorts. The overall conclusion is that use of combinations of variables to improve prediction is not worth the effort. In other words, where a single variable is being predicted (e.g. reading scores or self-direction), multiple predictors have an effect only in so far as they tend to tap the same predictive characteristic.

Finally, it is worth noting that teacher ratings in kindergarten generally give equally powerful predictions of both tested and rated characteristics in grades 3 and that these ratings give as powerful predictions as test data.

## SUMMARY AND CONCLUSIONS

Longitudinal findings through grade 2 concerning children identified by their teachers in junior or senior kindergarten as "thriving", "average", or "non-thriving" were reported in Biemiller (1983). This report extends those findings to grades 3 and 4 and applies more refined teacher rating measures. The major findings may be stated as follows:

1. The originally identified groups continued to differ by about 1-2 grade levels between "thrivers" and "non-thrivers" on achievement tests.

2. There were parallel differences between the thrive groups in ratings of self-direction, resistance to distraction, and risk-taking. These differences were apparent in kindergarten teacher ratings.

3. There were no large thrive-related differences in teacher ratings of social abilities or resistance to frustration by grades 3 or 4. This suggests that these characteristics were more subject to change over the years.

4 Children who in the view of their grade 3 or 4 teacher, changed from average to thrive status or vice versa generally showed parallel changes in test scores and ratings when compared to children who did not change status. However, children seen as changing from non-thrive to average status did not show parallel changes in test scores. Grade 4 children did show changes in ratings but grade 3 children did not. (This may be due to a small sample)

5. Examination of kindergarten tests and ratings of children whose thrive ratings remained consistent versus those who changed did not identify any particular scores or patterns which would permit prediction of changes.

6. In sum, while kindergarten teachers' global thrive ratings, specific behavior ratings, and independent tests all have considerable predictive power, many children showed considerable change (mostly for the better) and these changes were not predictable using the instruments in this study.

7. Correlational analysis continues to indicate substantial longitudinal and concurrent relationships between some teacher-rated variables (self-direction, resistance to distraction, and risk-taking). By grades 3 and 4, rated social abilities and resistance to frustration had little relationship to academic test scores, although they were strongly related to teacher ratings of self-direction, and resistance to distraction.

These results have implications for the concept of "thriving", for the early identification of school problems, and for teaching practice.

### Implications for the Concept of "Thriving"

The findings continue to support the "thrive dimension" - the concept that children are perceived by teachers to have a variety of related characteristics including academic performance, self-direction, and risk-taking. These characteristics show some stability over time. In addition, two other characteristics are strongly related to teachers' perceptions of "thriving" at a given point in time, but do not show stability over time. These are social abilities and resistance to frustration.

Although some of these variables are clearly and strongly related to academic performance (e.g. self-direction and resistance to distraction) others appear to be more related to perceptions of thriving than to performance. This is appropriate - we have long emphasized that education is more than learning school skills. However, the fact that some aspects of

thriving are more stable over time than others has additional implications for teaching and will be discussed further under that topic.

It is worth noting that the social abilities and resistance to frustration of these children have ceased to distinguish them from the others. While teachers' perceptions of thriving have included these characteristics, the characteristics have changed. This shows that teachers are not rating children on the basis of one or two characteristics (e.g., academic performance) and simply ascribing high and low status on other characteristics to correspond with this rating.

## Implications for Early Identification Process

This study also has definite implications for attempts to identify children's educational needs and problems early in their school experience. It remains clear that "non-thrivers" identified by both junior and senior kindergarten teachers were continuing to perform academically less well in third and fourth grade. Some of these children (in fourth grade only) showed considerable improvement in other thrive-related characteristics, and were in fact perceived as now "making average progress" despite their poor academic showing. Whether improvements in self-direction, resistance to distraction, risk-taking, and other characteristics will later aid in improved academic performance, or whether these children have simply become easier to live with and hence are seen as "thriving" more is unknown at this time.

Of children originally seen as average or thriving, more changes in both performance and ratings were seen. These may serve as a warning not to form fixed expectations too early, particularly in view of the non-predictability of these changes.

## Implications for Teaching

What do these findings mean for day-to-day teaching and the curriculum or goals we ought to have for children in elementary programs? We have seen that improvements and declines in academic success over the years were accompanied by changes in self-direction, resistance to distraction, and risk-taking. This is true for average and thriving children. It probably follows that efforts to enhance development in all these areas is desirable and that declines in self-direction etc. are warning signs. For non-thriving children, it is clear that improvements in these other characteristics did not help with school performance. Whether this is because these children are fundamentally different in their capacity to learn or in the way they manage their learning or whether they simply are slower to develop these capacities is unclear. Further study of these "non-thriving" children and others within the thrive rubric will be necessary to determine later outcomes and implications for teaching.

# APPENDIX A

## Revised Teacher-Rating Scales

Developed by A. Biemiller,
M. Richards, K. Main, M. Rochford,
E. Morley and C. Bruce with the
collaboration of many teachers.



Variable A100
SELF DIRECTION
&
SELF CONFIDENCE

| 1 | 2 | 3 | 4 | 5 | 9 |
|---|---|---|---|---|---|
| Hardly ever | Occasionally | About half the time | Often | Almost always | Not applicable |

Variable A101 FREE TIME IN CLASS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. | Child chooses an activity independently. | 1 | 2 | 3 | 4 | 5 | 9 |
| 2. | Child is able to initiate productive activity (e.g. project). | 1 | 2 | 3 | 4 | 5 | 9 |
| 3. | After choosing an activity or project, child can plan and carry it through to completion with a minimum of adult supervision. | 1 | 2 | 3 | 4 | 5 | 9 |

Variable A102 SELF CONFIDENCE

4. When confronted with a new situation involving new skills, does the child make a good effort to try?

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| never or almost never | rarely | sometimes | fairly often | nearly always or always |

5. When the child does not succeed quickly at a given task, what is her/his usual reaction?

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| very negative may throw a tantrum, unlikely to try again | negative, self confidence lower the next time he approaches the task | no reaction doesn't seem to care, may or may not try again | positive, not upset but somewhat more determined to succeed next time | very positive very determined and confident next time |

6. Make a general assessment of the child's approach to most situations:

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| not confident at all | not confident very often | varies | often confident | always very confident |

Variable A103 ACADEMIC ROUTINES

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 7. | On own initiative child makes use of dictionary, charts, other learning aids. | 1 | 2 | 3 | 4 | 5 | 9 |
| 8. | When given a choice in academic work periods, child can choose appropriate work with minimum of adult direction (e.g. book to read, math work, writing). | 1 | 2 | 3 | 4 | 5 | 9 |

Variable A104 TEACHER-SET TASKS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9. | Child carries out teacher-set task (e.g. runs errand, delivers message, helps another child). | 1 | 2 | 3 | 4 | 5 | 9 |
| 10. | Child follows instruction for seat work with a minimum of adult assistance. | 1 | 2 | 3 | 4 | 5 | 9 |
| 11. | Given an assignment at his or her level of ability, child can complete it in a reasonable amount of time. | 1 | 2 | 3 | 4 | 5 | 9 |

Variable B100

RESISTANCE TO DISTRACTION

| 1 Hardly ever | 2 Occasionally | 3 About half the time | 4 Often | 5 Almost always | 9 Not applicable |
|---|---|---|---|---|---|

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1. | If child's activity is interrupted he/she tries to go back to activity. | 1 | 2 | 3 | 4 | 5 | 9 |
| 2. | When working, this child seems to tune out distractions. | 1 | 2 | 3 | 4 | 5 | 9 |
| 3. | Child is easily drawn away from his/her work by noises, something outside the window, another child's whispering, etc. | 1<br>1 | 2<br>2 | 3<br>3 | 4<br>4 | 5<br>5 | 9<br>9 |
| 4. | Child quickly becomes impatient with a task he/she cannot grasp and goes on to something else. | 1 | 2 | 3 | 4 | 5 | 9 |
| 5. | During free play, child will stick to any one activity for only a short time. | 1 | 2 | 3 | 4 | 5 | 9 |
| 6. | If other children are talking or making noise while teacher is explaining a lesson, this child remains attentive to the teacher. | 1 | 2 | 3 | 4 | 5 | 9 |
| 7. | This child is easily sidetracked. | 1 | 2 | 3 | 4 | 5 | 9 |

Variable C100

SOCIAL ABILITIES

| | 1 Hardly ever | 2 Occasionally | 3 About half the time | 4 Often | 5 Almost always | | | | 9 Not applicable | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Child accepts leadership appropriately (i.e. co-operatively, can follow another's lead when appropriate). | | | | 1 | 2 | 3 | 4 | 5 | 9 |
| 2. | Successfully gets the attention of other children in a pleasant, acceptable way (by moving toward, standing or sitting near, touching, calling to, showing something, telling something). | | | | 1 | 2 | 3 | 4 | 5 | 9 |
| 3. | Successfully uses other children as a resource (seeks information, explanations, or judgements; seeks help with equipment, etc.). | | | | 1 | 2 | 3 | 4 | 5 | 9 |
| 4. | Successfully gets the attention of an adult in a pleasant, acceptable way (by moving toward, standing or sitting near, touching, calling to, showing something, telling something). | | | | 1 | 2 | 3 | 4 | 5 | 9 |
| 5. | Successfully uses an adult as a resource (seeks information, explanations, or judgements; in peer disputes seeks help with equipment, clothes, etc.). | | | | 1 | 2 | 3 | 4 | 5 | 9 |
| 6. | The child successfully uses negotiation to resolve a conflict with another child. | | | | 1 | 2 | 3 | 4 | 5 | 9 |
| 7. | The child is concerned about the needs and feelings of others. | | | | 1 | 2 | 3 | 4 | 5 | 9 |
| 8. | Child helps others in a pleasant way (without insisting). | | | | 1 | 2 | 3 | 4 | 5 | 9 |
| 9. | Child joins a group already playing without disrupting the group or its activity. | | | | 1 | 2 | 3 | 4 | 5 | 9 |
| 10. | When with other children, this child seems to be having a good time. | | | | 1 | 2 | 3 | 4 | 5 | 9 |

Variable D100

RESISTANCE TO FRUSTRATION

| 1 | 2 | 3 | 4 | 5 | 9 |
|---|---|---|---|---|---|
| Hardly ever | Occasionally | About half the time | Often | Almost always | Not applicable |

Variable D101 RESPONSE TO FRUSTRATION

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1. | When playing with other children this child argues with them. | 1 | 2 | 3 | 4 | 5 | 9 |
| 2. | Child becomes easily upset when he/she loses a game | 1 | 2 | 3 | 4 | 5 | 9 |
| 3. | Child complains to teacher about other children. | 1 | 2 | 3 | 4 | 5 | 9 |
| 4. | Child lets other children know when he/she does not like something by yelling or fighting. | 1 | 2 | 3 | 4 | 5 | 9 |
| 5. | When child can't have or do something he/she wants, child becomes annoyed or upset. | 1 | 2 | 3 | 4 | 5 | 9 |

Variable D102 CLASSROOM MANAGEMENT ROUTINES

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 6. | Child takes responsibility for care and storage of materials and equipment. | 1 | 2 | 3 | 4 | 5 | 9 |
| 7. | Child follows behaviour guidelines without being reminded. | 1 | 2 | 3 | 4 | 5 | 9 |
| 8. | Child follows procedures for special events (e.g. library, field trips, fire drill). | 1 | 2 | 3 | 4 | 5 | 9 |

Variable D103 CLASSROOM SELF CONTROL

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 9. | Child is able to sit quietly for a reasonable amount of time (as compared to classmates). | 1 | 2 | 3 | 4 | 5 | 9 |
| 10. | Child sits still when a story is being told or read. | 1 | 2 | 3 | 4 | 5 | 9 |
| 11. | Child seems to have difficulty sitting still, may wriggle a lot or get out of seat. | 1 | 2 | 3 | 4 | 5 | 9 |

Variable E100

RISK TAKING

| 1 | 2 | 3 | 4 | 5 | 9 |
|---|---|---|---|---|---|
| Hardly ever | Occasionally | About half the time | Often | Almost always | Not applicable |

Variable E101 TEACHER-GUIDED GROUP SITUATIONS

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1. | During teacher-guided group activity the child participates in activities as part of the group. | 1 | 2 | 3 | 4 | 5 | 9 |
| 2. | During teacher-guided group activity the child answers questions when called on. | 1 | 2 | 3 | 4 | 5 | 9 |
| 3. | During teacher-guided group activity the child will address the whole group (e.g. show and tell, etc.). | 1 | 2 | 3 | 4 | 5 | 9 |
| 4. | Child will get up and perform before the class (sing, recite, etc.) with no hesitation, even the first time. | 1 | 2 | 3 | 4 | 5 | 9 |

Variable E102 NEW SITUATIONS

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 5. | Child gets involved immediately in new learning situations. | 1 | 2 | 3 | 4 | 5 | 9 |
| 6. | Child is shy with adults he/she doesn't know. | 1 | 2 | 3 | 4 | 5 | 9 |
| 7. | If initially hesitant about entering into new games and activities, child gets over it quickly. | 1 | 2 | 3 | 4 | 5 | 9 |
| 8. | Child will initially avoid new games and activities, preferring to sit on the side and watch. | 1 | 2 | 3 | 4 | 5 | 9 |

APPENDIX B

The Role of Perceived Self-Competence

in Academic Performance--A Tale of Two Cohorts

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# The Role of Perceived Self-Competence in Academic Performance --A Tale of Two Cohorts

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"Self-concept", "self-esteem", and various other constructs concerning one's conceptualization and evaluation of self have long been assumed to play a major role in children's academic performance as well as playing a major role in social and emotional functioning (see, for example, Elkins, 1979; Samuels, 1977).

However, in recent years there has been substantial criticism on methodological, theoretical, and empirical grounds of the emphasis placed on self-concept/esteem/efficacy variables.

Methodologically, Wylie (1974), and Crowne & Stevens (1968), have pointed out that existing measures are psychometrically very poor, both in terms of internal consistency and evidence for external validity.

Recently, however, several researchers have attempted to improve on the poor psychometric characteristics of self-concept measures. Harter (1981, 1982) has developed a new "self-efficacy" measure which provides factorially independent dimensions of cognitive, social, physical, and general "self-efficacy" reports--conceptually based on the work of White, 1959. Wheeler and Ladd (1982) have developed the Children's Self Efficacy for Peer Interaction (CSPI) Scale intended to assess aspects of social competence and acceptance, while Asher, Hymel and Renshaw have developed a "loneliness" scale. Each has been validated against peer nomination and teacher rating measures.

Theoretically, a large majority of self-whatever research has tended to ignore the mainstream of developmental knowledge and constructs. Damon and Hart's (1982) recent review of this topic has clearly specified a number of the difficulties. First, before concerning ourselves with self-evaluation or esteem, we must consider what the child can and does know about herself. As Damon and Hart point out, in all likelihood, this self-knowledge will be limited by the same cognitive-developmental factors which limit young children's knowledge of other people and of the natural world. In short, the nature and content of the self knowledge of four year olds will be dramatically different from that of seven year olds, who in turn, will differ from 10 or 15 year olds.

Empirically, "self-concept" and "self-esteem" measures have not been particularly powerful correlates or predictors of achievement or other aspects of children's functioning

(Wylie, 1974). More recently Bloom (1976) has reported that self-concept variables may account for as much as 25 percent of achievement variance. However, Bloom (personal communication) suspects this may be more as a consequence than a cause of ability.

Beyond the problem of cognitive developmental limitations on self-knowledge are questions about the content and directions of influence of self-knowledge and self-evaluation. Most theories (explicit and implicit) of self-knowledge and evaluation stress the effects of (1) "success"[1] (e.g. Bandura, 1978, 1982; White, 1959; Atkinson and Feather, 1966); and (2) evaluations by "significant others" (parents, teachers, peers, etc.) (Mead, 1936) in determining both the content of one's performance that is attended to and evaluated, and the evaluation given. As these evaluations grow more important to the individual, the whole Freudian paraphernalia of "defence mechanisms" protecting the "self" from excessive negative evaluation come into play (Fine, 1979, pp. 294-318; Murphy, 1962; Freud 1936; Murphy and Moriarity, 1977). Indeed, there is evidence that these mechanisms can appear quite early in life (Erikson, 1950; Mattick, 1966).

At any rate, to the extent that self-knowledge and especially self-esteem are influenced by self-perceived and other-evaluated success, we find ourselves in the classic "vicious circle". Success breeds positive self-evaluations of one's performance or functioning which in turn facilitate more positive performance and so on, ad infinitum. In short, the able get abler and the unable get unabler!

Some psychologists and educators who accept this thesis, have argued for treatments which emphasize the experience of success (Bandura, 1982; Holt, 1968; and many others). Much of the debate over "streaming" (e.g. O'Connor, Atkinson and Horner, 1966) and "mainstreaming" has revolved around this circular effect of perceived success and performance--with adherents of both sides of this issue appealing to the importance of building positive self-esteem!

If positive self-evaluation or esteem is the <u>product</u> rather than <u>cause</u> of effective performance, then we might assume that children who excel in some aspects of performance at time A might be expected both to excel at time B and to have a positive evaluation of their work, and vice versa. However, in this case, self-evaluation should not increase the prediction of performance from time A to time B but merely be correlated with it. It is, of course, a well established empirical fact that children who do well at time A tend to do well at time B--especially if time B is not many years removed from time A (Bloom, 1964, 1976; Krauss, 1973; and many other studies and reviews). On the other hand, if positive self-evaluations are at least partially independent of prior performance, and can facilitate current performance, then self-evaluation data should add to the predictive power of prior performance.

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1. I will only briefly note here that "success" is a very slippery concept. We are clearly talking about subjective success--success in the eye of the actor. That in turn implies evaluation by the actor of the results or quality of her actions against a personally adopted standard. The nature and influences on such standards are, at best, very little understood.

## The Present Study

The purpose of the research reported here is to examine the effect of children's self-reports for improving the prediction of a number of specific achievement, social ability, self-direction, and temperamental characteristics between grades 1 & 2 and 3 & 4. The present report will include longitudinal findings concerning the tests (vocabulary, reading, mathematics) and teacher ratings (thrive, social ability, self-direction, and temperament); analyses of the self-report instrument used (based on items drawn from Harter, 1982; Wheeler and Ladd, 1982; and Asher, Hymel & Renshaw); correlations between self-reported evaluations and tests and ratings; and multiple regression analyses of measures given in 1980 and 1982 as predictors of themselves with selected self-report scales as additional predictors.

## Methods and Procedures

Research reported here is a small piece of a much larger 4 year longitudinal study of two cohorts of children first studied in the spring of 1978. At that time one cohort (N=44) was in "junior" or 4 year old kindergarten while the other was in "senior" or five year old kindergarten (N=110). Both cohorts were involved in further study in first and second grades (1980) and third and fourth grades (1982). All but 24 senior kindergarten children attended rural Catholic schools in southern Ontario. These 24 attended urban Catholic schools in a small Ontario city. No notable differences have been found between the rural and urban groups (Biemiller, 1983). The two cohorts each contained three groups of children, nominated by their kindergarten teachers. One group was perceived as "thriving in terms of your goals". The second group was "making average progress in terms of your goals". The third group was "not as yet thriving in terms of your goals"[2].

Previous reports on this sample have shown that differences between "thriving", "average" and "non-thriving" groups were maintained between 1978 and 1982 in achievement and a variety of teacher rated characteristics (Biemiller, 1982), and that in this unusual population, S.E.S. variables and kindergarten program differences had little impact on children's functioning or "thrive" status (Biemiller, 1983).

## Measures

Vocabulary. The Bankson Language Test (1977) vocabulary scale was used in 1980. The W.I.S.C. (1974) vocabulary subscale was used in 1982. Both were administered individually.

Achievement Tests. The appropriate mathematics computation and word knowledge subscales of the Metropolitan Achievement Tests were administered in 1980 and 1982. Groups of three to six children were tested together.

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2. This method of selection was adopted from Prescott (1973).

Teacher Ratings. Ratings of social abilities, self-direction, persistance/distractability, reactivity, and risk-taking were filled out by each child's teacher. The first two scales were developed by my colleagues and myself during the past four years. The last three scales were largely derived from Thomas and Chess' Teacher Temperament Scales (1977, pp. 239-246). The persistance/distractability scale consists of items from these two Thomas and Chess scales. Risk-taking includes items from Thomas and Chess' "approach/withdrawal" scale plus items concerning children's willingness to participate actively in groups. Reactivity includes items from Thomas and Chess' negative mood and activity scales plus items related to following classroom routines. The present form of the scales was developed on the basis of factor analyses performed on samples of 89 kindergarten, 125 grade 1 and 155 grade 2 children who were not preselected for "thrive status" (Biemiller and Richards, 1983).

Teachers' thrive ratings in 1980 and 1982 were also obtained. Teachers were asked to divide their classes into thirds using the "thrive" definitions given earlier. They were then to assign each study child to one of the groups. Values of 3 for thrive, 2 for average, and 1 for non-thrive were assigned. Evidence presented in Biemiller (1983, and 1982) indicated that these ratings were quite valid.

All teachers and testers involved in the 1980 and 1982 studies were "blind" to the original thrive status of the children.

Self-Report Instrument. The self-report instrument used in this study included 16 items drawn from Wheeler and Ladd's (1982) Children's Self-Efficacy for Peer Interaction Scale; 10 items from Harter's (1982) Perceived Competence Scale for Children; and 13 items from Asher, Hymel and Renshaw's Loneliness Scale. Four other items were created for a total of 43 items. Contrary to the original design of the Wheeler and Ladd, and Harter scales, a five point scale including "always", "most times", "sometimes", "hardly ever" and "never" was used with each scale in order to achieve a common response framework. Some questions had to be reworded to fit this format. (At the time the interview scale was constructed, we had draft copies of the other scales but not papers giving the rationale underlying their format. With hindsight, we would probably have used Harter's 28 item scale as designed.)

## Results

This section will be divided into three parts. The first will concern longitudinal relationships between test and teacher-rating data in 1980 and 1982. These data will demonstrate that for many variables in the study, substantial stability exists over time. This is true both for test data and teacher-rated data. The second part of this section will concern the structure of the interview data used to assess self-evaluation in a variety of areas. Unfortunately, these data indicate that the scales drawn from the literature show little internal consistency. Factor analyses of the data do not generally confirm the original scales. Four short scales, consistent in both cohorts, were derived from the factor analysis. Part three concerns relationships between the factored scales with grade 3 or 4 outcome variables, and their effect in increasing predictions based on the same or similar

variables in grades 1 or 2. In general, relationships between interview variables and 1982 outcome variables were low. Thus it is not surprising that in most cases, predictions were increased only slightly by the addition of self-concept information.

## Stability of Test and Rating Variables

Table 1 shows correlations between 1980 and 1982 assessments of "thriving", vocabulary, academic achievement, social skills, self-direction, and three temperament characteristics. Underscored values are the correlation of each measure with itself two years later.

TABLE 1
Correlations Between 1980 (grades 1 and 2) and 1982 (grades 3 and 4) Tests and Ratings. (Only correlations of 30 and over shown.)

| | 1982 Measures | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Tests | | | Ratings | | | | | |
| 1980 Measures | Vocabu-lary | Word Knowledge | Math Comput. | Thrive Rating | Social Skill | Self Dir. | Persis. Distr. | Risk-Taking | Reac-tivity |
| Vocabulary | | | | | | | | | |
| gr. 1-3 | .53 | .50 | .42 | .31 | .37 | .50 | | .39 | |
| gr. 2-4 | .42 | .40 | .46 | .31 | | | | .32 | |
| Word Know. | | | | | | | | | |
| gr. 1-3 | | .58 | .59 | .50 | .61 | .73 | .72 | .53 | -.55 |
| gr. 2-4 | .39 | .64 | .57 | .50 | .34 | .48 | .41 | .36 | |
| Math Comp. | | | | | | | | | |
| gr. 1-3 | | | (.18) | | .30 | | | .32 | |
| gr. 2-4 | .30 | .45 | .60 | .49 | | .42 | .40 | .38 | |
| Thrive Rating | | | | | | | | | |
| gr. 1-3 | | .45 | .51 | .63 | .51 | .68 | .65 | .37 | -.48 |
| gr. 2-4 | .43 | .51 | .57 | .59 | .32 | .61 | .44 | .44 | |
| Soc. Skill | | | | | | | | | |
| gr. 1-3 | | | | | .30 | | | | -.31 |
| gr. 2-4 | | | | .32 | .33 | .35 | | .31 | |
| Self Dir. | | | | | | | | | |
| gr. 1-3 | | .37 | .46 | .54 | .30 | .52 | .52 | | -.45 |
| gr. 2-4 | .30 | .45 | .50 | .65 | .42 | .63 | 50 | .47 | |
| Persis./Distr. | | | | | | | | | |
| gr. 1-3 | | .43 | .58 | .34 | | .42 | (.23) | .32 | |
| gr. 2-4 | | .36 | .34 | .50 | .56 | .52 | .51 | | -.36 |
| Risk-Taking | | | | | | | | | |
| gr. 1-3 | .35 | .43 | | | .41 | .45 | | .46 | |
| gr. 2-4 | | .35 | .38 | .50 | | .47 | .33 | .53 | |
| Reactivity | | | | | | | | | |
| gr.1-3 | | | -.51 | -.41 | -.50 | -.46 | -.32 | -.34 | .57 |
| gr. 2-4 | | | -.30 | -.40 | -.54 | -.45 | -.47 | | .41 |

Several observations are worth making concerning these data. First, in 1980 vocabulary, word knowledge, text time, math computation, self-direction (grade 4), persistance (grade 4), risk-taking (grade 4), and reactivity all predicted the same variables in 1982 more strongly than any other variable. (Undoubtedly, combinations of 1980 variables will further enhance prediction. (See, for example, Biemiller, 1983, pp. 80-92.)

Second, when ratings and tests are compared as predictors of functioning two years later, the following points are noteworthy:

1. "Thriving", as perceived by teachers in 1982, is better predicted by 1980 "thriving" and teacher-rated self-direction than by other measures.

2. In general, tests produced the highest predictions of other tests. In grade 3, they also produced the highest predictions of 1982 ratings. In grade 4, earlier ratings produced the highest predictions of other ratings.

3. The grade 1 math computation test was not an effective predictor.

Generally speaking the magnitudes of correlations between grades 1 or 2 and 3 or 4 are similar to those between kindergarten and grades 1 or 2 (reported in Biemiller, 1983).

Structure of Interview-Based Self-Efficacy Measures

Varimax factor analyses of grade 3 and 4 interview items failed to confirm the scales as derived from their original sources. In each case, there were typically as many different factors with loadings of .3 or more associated with items in each scale as there were items in the scale!

However, examination of both the factor analyses and item correlations did suggest four small self-evaluation scales which appeared to be factorially consistent in both cohorts. These scales included social-positive evaluations (3 items); social-negative evaluations (2 items); physical skill positive evaluations (2 items); and general negative evaluations (4 items). Factor loadings of .3 or more are shown in table 2.

TABLE 2
Factor Loadings for Self-Reported Evaluation Items.
(Only values of .30 and over shown.)

| | Factor and Grade | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Social Positive | | Social Negative | | Physical Positive | | Physical Negative | |
| Item | Gr.3 | Gr.4 | Gr.3 | Gr.4 | Gr.3 | Gr.4 | Gr.3 | Gr.4 |
| Social Positive | | | | | | | | |
| Can find friend | .59 | .65 | | | | | | |
| School work quickly | .44 | .44 | | | | | | |
| With many kids | .74 | .75 | | | | | | |
| Social Negative | | | | | | | | |
| Hard join group | (.30) | | .60 | .80 | | | | |
| Hard avoid transgr. | | | .91 | .52 | | | | |
| Physical Positive | | | | | | | | |
| Do any sport | | | | | .54 | .51 | | |
| Better at sports | | | | | .48 | .69 | | |
| General Negative | | | | | | | | |
| Like music | | | | | | | .65 | .71 |
| Lonely | | | | | (.60) | | | .80 |
| Would change self | | | | | (.31) | | .72 | .60 |
| Forget what learn | | | | | (.38) | | .38 | .36 |

The Role of Self Evaluation Variables in Predicting Test Performance and Teacher-Rated Characteristics

Table 3 shows correlations over .30 between factored self-evaluation variables and 1982 outcome variables. It is evident (1) that there are no correlations of any meaningful magnitude between self-evaluation variables and tests of vocabulary, word knowledge, or math computation; and (2) that in the grade 3 cohort there are several correlations between self-evaluation variables and teacher-ratings in the .30-.50 range, mostly with the "general negative evaluation" factor. Unfortunately, there is only one correlation over .30 between self-concept and teacher-ratings in the grade 4 cohort, and that does not correspond to any of the grade 3 correlations. (I should note that the unreported correlations are not just below .30 but actually do not exceed .20 in all but one case. This anomoly will be addressed in the discussion.)

TABLE 3
Correlations Between 1982 Test and Rating Variables and Self-Evaluation Scales. (Only correlations of .30 and over shown.)

| 1982 Test and Rating Variables | Self Evaluation Scales: Social Positive | Social Negative | Physical Positive | General Negative |
|---|---|---|---|---|
| Vocabulary | | | | |
| Gr. 3 | | | | |
| Gr. 4 | | | | |
| Word Knowledge | | | | |
| Gr. 3 | | | | |
| Gr. 4 | | | | |
| Math Computation | | | | |
| Gr. 3 | | | | |
| Gr. 4 | | | | |
| Thrive Rating | | | | |
| Gr. 3 | | | | -.30 |
| Gr. 4 | ina | ina | ina | ina |
| Social Skill | | | | |
| Gr. 3 | | | | -.56 |
| Gr. 4 | | | | |
| Self-Direction | | | | |
| Gr. 3 | | | | -.34 |
| Gr. 4 | | | | |
| Persis./Distract. | | | | |
| Gr. 3 | | | | |
| Gr. 4 | | | | |
| Risk-Taking | | | | |
| Gr. 3 | | -.30 | | -.39 |
| Gr. 4 | | | | |
| Reactivity | | | | |
| Gr. 3 | | | | .46 |
| Gr. 4 | -.31 | | | |

As noted in the introduction, self-evaluative variables may be as much the consequences as the causes of various aspects of children's functioning. Therefore, one of the main concerns of this study was the degree to which self-evaluation measures could be predicted from earlier indices of performance or other characteristics. However, an examination of 1980 tests and ratings by 1982 self-evaluative reports found only four correlations of negative evaluation. These correlations were with 1980 thrive rating (-.35), persistance (-.42), risk-taking (-.34), and reactivity (.51). Unfortunately, no similar pattern was found in the grade 2-4 cohort.

Table 4 shows cases of multiple regressions in which self-evaluative variables added five or more percent to the prediction of a variable by itself two years earlier.

TABLE 4

Multiple Regression Analyses Between 1980 and 1982 Variables with Self-Evaluation Variables as Additional Predictors. (Only cases in which self-evaluation variables added 5 or more percent to predictions shown.)

| Test or Rating Variable | Total 1982 Variance | 1982 Associated with 1980 var.[3] | Additional Variables | Self Evaluation |
|---|---|---|---|---|
| Vocabulary | | | | |
| gr. 1-3 | | | | |
| gr. 2-4 | 42% | 26% | Phys. (13%) | Gen. Neg. (3%) |
| Word Knowl. | | | | |
| gr. 1-3 | 42% | 22% | Gen. Neg. (18%) | Phys. (2%) |
| gr. 2-4 | | | | |
| Math Comp. | | | | |
| gr. 1-3 | 56% | 33% | Soc. Pos. (18%) | Gen. Neg. (5%) |
| gr. 2-4 | 49% | 44% | Phys. (3%) | Soc. Neg. (2%) |
| Thrive Rating | | | | |
| gr. 1-3 | | | | |
| gr. 2-4 | | | | |
| Social Skill | | | | |
| gr. 1-3 | 33% | 14% | Gen. Neg. (6%)<br>Phys. (5%) | Soc. Pos. (6%) |
| gr. 2-4 | | | | |
| Self-Dir. | | | | |
| gr. 1-3 | | | | |
| gr. 2-4 | | | | |
| Persis./Distr. | | | | |
| gr. 1-3 | | | | |
| gr. 2-4 | | | | |
| Risk-Taking | | | | |
| gr. 1-3 | | | | |
| gr. 2-4 | | | | |
| Reactivity | | | | |
| gr. 1-3 | 43% | 13% | Soc. Neg. (9%)<br>Phys. (5%) | Gen. Neg. (6%) |
| gr. 2-4 | 37% | 27% | Soc. Pos. (6%)<br>Soc. Neg. (4%) | Phys. (5%) |

Table 4 shows substantial added variance for both cohorts in math computation, and reactivity. In the case of reactivity, social negative and physical positive evaluation were involved as well as general negative (3rd grade) and social positive (4th grade). In addition, substantial added variance occured in grade 3 for word knowledge, and in grade 4 for vocabulary and social skill. In these cases general negative and physical positive evaluations were involved.

3. Values differ slightly from those expected from table 1 due to restrictions to cases with complete data.

Discussion

Overall, it must be said that the role of self-evaluation measures in this study is underwhelming. A discouragingly small number of outcome variables of known significance (Biemiller, 1983; Biemiller and Richards, 1983) were correlated to a meaningful degree with self-evaluation measures in the multiple regression analysis. The fact that only half of those multiple correlations were replicated in both cohorts is more discouraging. Furthermore, the failure to replicate previously established scales (excepting Harter's physical efficacy) raises more concern about the use of self-evaluation scales. Is the theoretical significance of self-evaluation placed in jeopardy by these findings, or are there other explanations that should be considered?

First, in fairness to the developers of the scales used, it must be noted that changes in self-report format may have contributed to the failure to replicate scales. While pretest data had suggested that the format used here was easier for children, it may have failed to bring out the dimensions detected by Harter (1982); Ladd and Wheeler (1982) and Asher et al.

As to the theoretical significance of self-evaluation, recent research in the meta-cognitive (Flavel and Wellman, 1977; Brown, 1980; Mischel and Mischel, 1983; and "planning" Mischel and Patterson, 1978) traditions strongly suggest that self-processes do play a significant role in children's functioning. Bandura's (1977, 1982) work on efficacy evaluations with adults strongly suggests that at some point in development these become significant, while Mattick's (1966) observations of young children indicate that that developmental point may be quite early--well before ages 9 or 10 examined in this study.

All of this suggests that the failure to find a wider range of self-evaluative effects and more clear cut factors is probably due to methodological problems and possibly a lack of sophistication in understanding the role of low self-efficacy.

In the area of methodology, my colleagues and I have recently been exploring in our own laboratory a technique which we believe draws out a much richer picture of the relationship between children's self-perceptions/self-evaluations and functioning. As described by Ellen Regan at this conference, we have been videotaping children's decisions and then interviewing them about the tapes (Regan and Biemiller, 1983). This technique holds considerable promise for tapping the interaction of children's self-expectations and specific task situations. Doubtless other more individualized approaches and long standing clinical techniques are being used elsewhere to work on the same problems.

Our lack of sophistication, common to many (Bandura excepted) who talk readily about "self-concepts" and "self-esteem" lies in treating these characteristics as simple traits which are expected to have a simple or additive effect on performance and functioning. Yet, as my own eleven year old observed when I described these findings to him, "A kid who thinks he doesn't do something well might decide not to try, or might decide to try extra hard". So much for Ph.D.'s in psychology! Seriously, I will conclude with the suggestion that those who

are interested in the role of self-processes in human functioning need to adopt more situation-person interactive approaches as suggested by Mischel (1968, 1973) and Murphy and Moriarity (1976). Conversely, attempts to develop general "scales" dealing with self-evaluations may well be less fruitful.

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